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AN AMERICAN RAILWAY IN COLOMBIA

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By FRANCIS R. HART

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AN AMERICAN RAILWAY IN COLOMBIA.

By FRANCIS R. HART.

Read March 23, 1899.

Although the Republic of Colombia is the nearest South American neighbor to the United States, the fact that it requires an introduction, both geographical and descriptive, to the majority of North Americans, will make an account of the American interests in that country clearer if prefaced by a brief sketch of its history and physical characteristics. It was Columbus himself who in September, 1502, discovered Cape Gracias á Dios, and in October of the same year touched at what is now Bocas del Toro on the Colombian coast.

Colombia occupies that corner of South America which is connected with Central and North America by the Isthmus of Panamá, the isthmus being politically a part of Colombia. Its coast line on the Caribbean Sea is a little under one thousand miles, and on the Pacific it extends south to its boundary with Ecuador, the southern neighbor of Colombia. On the east and southeast it is bounded by Venezuela and Brazil. In extent it reaches from the equator to about twelve degrees north latitude. In area it is more than double that of the Spanish peninsula, or about 500,000 square miles. The settlement of the country by the Spaniards began in the second decade of the sixteenth century, and by the middle of that century their power was fairly established.

Cartagena, with which this paper will more particularly deal, was founded about 1533 on the beautiful land-locked bay of the same name. In those days of conquest, when the Caribbean Sea was the great hunting ground for freebooters and buccaneers, a safe storehouse for treasure, and a rendezvous for the ships of Spain were a necessity, and led to the construction of strong fortifications to guard the town and harbor of Cartagena, fortifications which stand to-day for the most part as solid and perfect as when first built three centuries ago.

In 1819, Colombia, guided by the powerful hand of the great patriot Bolivar, won her independence from Spain, and established herself as a republic. After many years of internal political dissensions, during

which the country bore successively the names "Republica de Colombia," "Republica de Nueva-Granada," "Estado Unidos de Colombia," a more settled organization was effected in 1885, the independence of separate states abolished, and the country again called the "Republica de Colombia," its present name. To-day Colombia is a single republican State, divided into departments, each department having a governor appointed by the central authority, and an elected legislative assembly.

The lines of communication between the Atlantic, or Caribbean, coast and the interior of the country are by the great river systems, chief among which is that of the Magdalena. The vast importance of the Magdalena River as a commercial highway will be seen at a glance on the map of its valley. This great river is navigable for 750 miles from its mouth by river steamboats of good size. Unfortunately for Colombia, the mouth of the Magdalena is rendered difficult for ocean steamships to enter by reason of the strong currents and shifting bars, and various unsatisfactory attempts to connect the river by an inland waterway with one of the coast harbors or bays made the necessity of a railway connection between the river and one or more coast ports imperative.

In 1880 there was completed and opened to the public service a short railway connecting the town of Barranquilla on the west bank of the river near its mouth, with the open Bay of Savanilla, a few miles west of the mouth. This railway was the property of the Colombian government, but its title passed to an English corporation which extended the railway to a more convenient terminus near the open end of the bay, and constructed a steel pier over 4,000 feet long in order to reach water sufficiently deep to permit steamships to lay alongside. The opening of this railway served to give to Barranquilla a commercial prominence heretofore held by Cartagena and Santa-Marta, both of which coast towns were connected by interior waterways with the river.

The magnificent harbor of Cartagena, rendered doubly secure by the artificial closing of its larger entrance, Boca Grande, by the Spaniards in the early days, had made of that city an ideal port, ranking among the six or seven finest in the world. The water route to the river, consisting partly of a natural delta of the Magdalena, or connecting chain of lagoons, and partly of an artificial canal designed by the eminent engineer Totten, was not sufficiently to be relied upon in

View of Cartagena, from San Felipe.

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Street Scene, Cartagena.

all seasons of the year to permit Cartagena to maintain its commercial supremacy in competition with the Barranquilla rail route to the coast. The unsatisfactory nature of the Bay of Savanilla as a harbor, it being an open roadstead, combined with the natural desire of the Colombian people to reëstablish Cartagena in its once prominent position, induced the government and people to urge the building of a railway to connect Cartagena directly with the river.

In 1890 and 1892, concessions were granted by the government of Colombia to Samuel B. McConnico, Esq., an American, giving him the right to build and operate such a railway, and to build and maintain wharves and warehouses at Cartagena, also giving certain exclusive privileges in connection with the rights for the term of fifty years. These concessions and rights were transferred to an American corporation, and the wharves, warehouses, and railway have been built, and a large fleet of river steamboats, operating in connection with the railway, has been placed upon the Magdalena River.

The object of this address to-night is to describe to you briefly the terminal works, railway and line of steamboats, owned and managed by an American corporation in Colombia. The railway and steamboat service taken together act as public carriers between Cartagena and points 800 miles in the interior, and represent an investment of about five million dollars American gold.

The concessions acquired by the American company include the exclusive privilege for a long term of years to maintain a service of lighters and tugs for the disembarking and embarking of cargoes, and for the construction and operation of wharves and terminal warehouses.

The company began active public business in 1891, handling the entire exports and imports of the port, using for the service two tugboats, one of English and one of American construction, and a fleet of lighters. This service continued until June 1, 1893, when the company's pier was completed, and the short terminal railway connecting the pier with the city proper opened to public service.

The pier is constructed of southern pitch pine, heavily creosoted for protection against the ravages of the teredo (*Teredo navalis*), and is 500 feet long by 120 feet wide, having a depth of water at the outer end of 40 feet, and a minimum depth alongside of from 29 to 30 feet. The material for the construction of this pier, the machinery used, and the skilled workmen employed, were all imported from the Gulf coast

of the United States. Extending nearly the whole length of the pier, and in its centre, is a warehouse 80 feet broad, part of which is used as a custom house, and part as a store for export goods. Upon each side of the pier between the warehouse and the water two lines of tracks are laid, and two lines run through the warehouse itself.

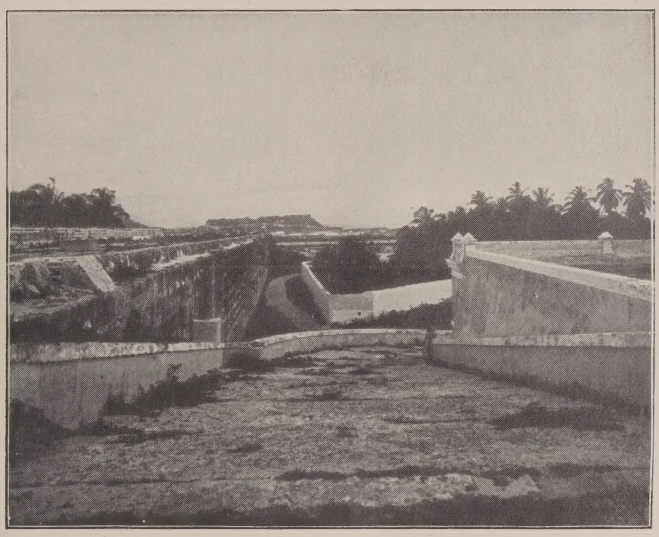
Imported goods are taken directly from the vessels' slings into the custom house and there, after examination and weighing, can be placed directly in the cars within the custom house itself. Export goods are discharged directly from the cars into the vessels' slings, or from the cars into the export section of the warehouse. At the inner end on one side of the pier is a special berth for colliers, with an elevated track and tram line to a conveniently placed depot for coals. Immediately adjoining the pier on the shore end, and connected with it by spur tracks, is the company's yard for the construction of steel river steamboats and lighters.

To this pier come regularly the steamships of the Royal Mail Steam Packet Company, the West-India & Pacific Steamship Company, the Harrison Line, the Compagnie Generale Transatlantique, the Hamburg-American Steam Packet Company, the Compañia Transatlantica de Barcelona, the Atlas Steamship Company, the Compañia Italiana, "La Veloce," and vessels of other but less regular lines.

The deep water of the harbor not extending to the city of Cartagena itself, it was necessary to place the pier at a point 1 kilometer from the city walls, and to connect the two by a railway. This short line of rails is laid for about two-thirds of its length across a mangrove swamp, and is solidly built on a causeway of corduroy topped with partially decomposed coral.

At the town end the line crosses an earth and stone wharf, or levee, placed just outside of the city wall, and connected with the city by two gates or ports, and upon the levee is a substantially built corrugated iron warehouse, local freight shed, offices, etc. To this levee, all, of course, under the control of the company, come to leave and take cargoes, the host of small 30- to 80-ton native-built coasting schooners, and the vessels of the coastal steamship companies. The pier, the short line of railway, the levee and warehouses, and the tugs and lighters make up the plant by means of which what is known as the "Terminal Service" of the company is performed.

It has been a matter of particular gratification to the directors of the company that the pier was so designed, both as to material and



An Inside Corner of the City Walls, Cartagena.

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The Pier, Cartagena.

method of construction, that it has shown no marked depreciation, either from the devouring worms, so prevalent in southern waters, or from the severe strains both of still and moving weights which have been constantly upon it.

While the terminal works were under construction, the work upon the main line of railway had been carried forward, and almost simultaneously with the opening of the pier service, the first section of the line, reaching from Cartagena to Turbaco, 24 kilometers (14½ miles), was formally opened to public service.

In making the preliminary surveys and final location of a railway line through a comparatively unsettled tropical country, no very great difficulties are necessarily encountered, but a multitude of small difficulties are almost certain to make vexatious delays. Notwithstanding the fact that Cartagena has been a place of importance for three and a half centuries, and that one-half the line of the Cartagena-Magdalena Railway follows closely the old highway or *Camino Real* of the *Conquistadores*, the only roads leading to the interior from Cartagena are rough mule trails, almost or quite impassable during the heavy rains. The absence of roads, and the thick, luxuriant, tropical vegetation made both the transportation of materials and supplies slow and laborious, and the use of instruments difficult. The inability of the younger engineers to speak Spanish added to the petty troubles of the engineering parties in the field.

After the preliminary work was finished, however, and the chief residencies established, *trochas* cut, mules and horses bought, and a definite organization adopted, the work of location and construction proceeded much as such work would in the United States, but less rapidly. With the exception of the trestle and bridge construction, and a certain amount of rock cuttings, the work was wholly performed by native laborers under the supervision of Americans or Europeans. The peasantry of Colombia, from whom the men employed were drawn, are the native full-blooded Indians and the various shades of Spanish cross-breeds. These men are, for the most part, well built and muscular, but irregular in their inclination for work, and loth to neglect for many consecutive days either the more congenial and less arduous task of field work in their own small plantain or maize plantations, or the welcome shade of their thatched huts. This natural irregularity is further increased by the great frequency of the days of *fiesta*, or Saints' days, which seriously interfere with all work in the Spanish-

American countries. In spite of generous wages offered, the labor problem was a troublesome one during the whole period of construction, and the number of men on the rolls seldom exceeded 1,200 to 1,600.

The length of the road from the pier at Cartagena to the terminus at Calamar, on the banks of the Magdalena River, is 106 kilometers (65 miles), the gauge 3 feet, and weight of rails 50 pounds to the meter. The cross-ties are placed 2,000 to the kilometer, or about 20 inches apart between centers. The maximum grade (made necessary in crossing over the Turbaco hills) is 2.5 per cent., and the sharpest curve has a radius of 478 feet. The highest elevation reached is 200 meters (656 feet) above the level of the sea, at kilometer 23 near Turbaco, and at Calamar, the river terminus, the elevation is but 8.5 meters (28 feet).[1]

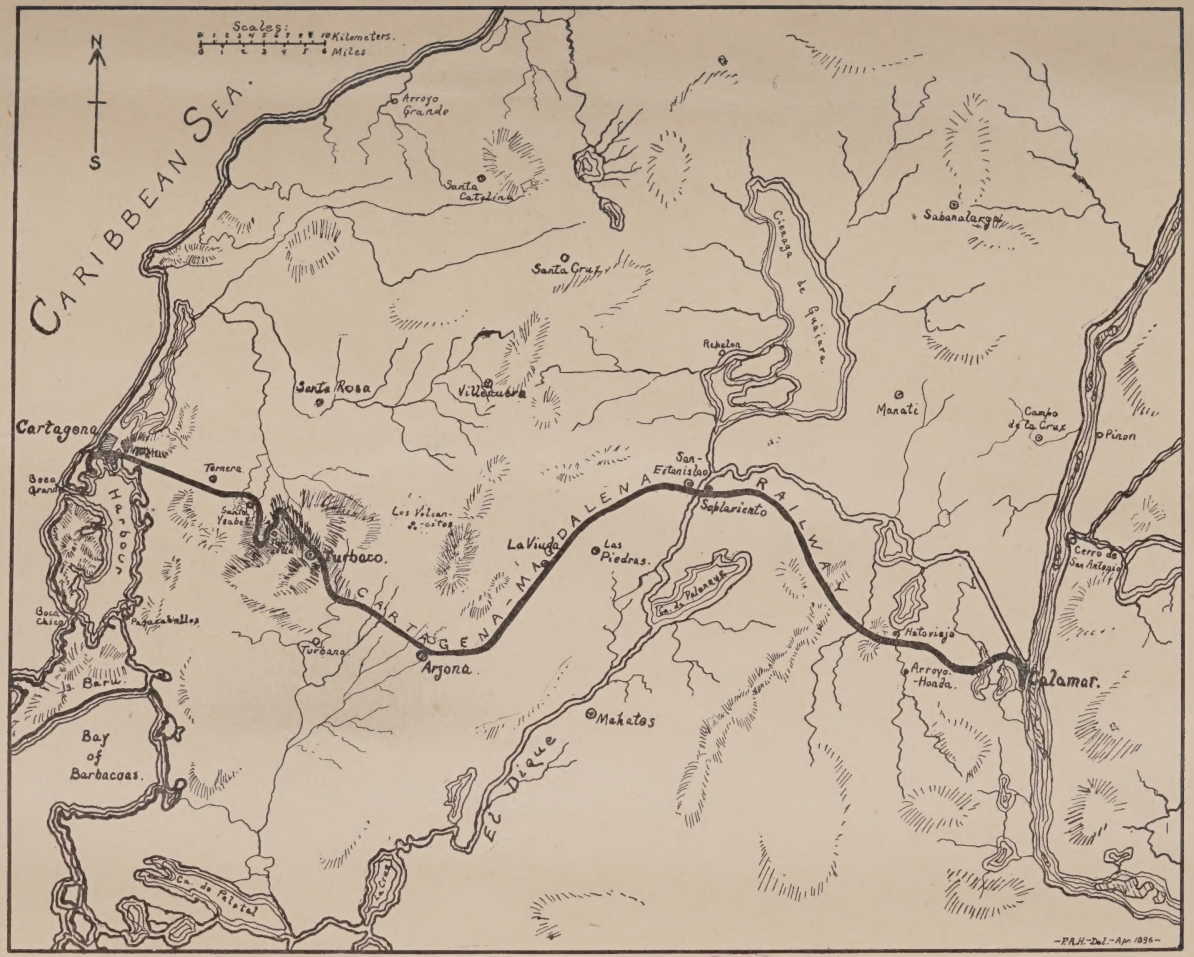
For crossing small streams, ravines, and lowlands subject to overflow, trestles of creosoted pitch pine were built, and the crossing of the Dique (the old waterway connecting Cartagena with the river) was effected by a steel bridge 120 feet long revolving on a central pier. The total amount of trestling was originally 3,358 meters (13,220 feet), but this is being reduced each year by the construction of permanent structures, culverts, etc.

The greater part of the cross-ties used were of fairly durable native woods, but the inability of the local contractors to deliver these sufficiently rapidly, made it necessary to import a certain quantity of American pine and cypress ties. Since the opening of the road, all tie renewals have been made with those of lignum-vitæ, which is so hard a wood that it is necessary to drill holes before the spikes can be driven, and which has a length of life hardly surpassed by the cross-ties of steel often used in tropical countries.

The permanent way is solidly built and well drained (the latter, perhaps, the most important quality of a good railway in the tropics), and withstands the heavy downpours of the rainy season in a manner which from the early experiences of the company's engineers during the construction period had seemed almost impossible.

The first section of the line is ballasted with decomposed or broken coral, and the appearance of the dazzling white roadbed and the lignum-vitæ cross-ties is sufficiently unusual to immediately attract the attention of the traveler from the north.

Along the line of the road are ten stations, with the necessary buildings, and at the termini are large warehouses, car sheds, shops,



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CHARACTERISTICS OF ROAD.[1]

Name.	From	To		Length in kilometers.	Alignment.			Profile.							Bridges.		Water stations.
					Length of straight lines in kilometers.	Number of curves.	Aggregate length of curves in kilometers.	Length of level lines in kilometers.	Ascending Grades.			Descending Grades.			Class.	Total lengths in meters.	
									Number.	Sum of ascents in meters.	Length of ascents in kilometers.	Number.	Sum of descents in meters.	Lengths of descents in kilometers.			
Main Line	Cartagena.	Calamar.	Main Line.	105.602	77.892	139	27.710	31.146	44	391.96	35.053	37	383.91	39.403	{ Wooden trestles, Steel bridge.	2884.66 40.00	5
Main Line	Cartagena.	Calamar.	Sidings.	7.398													
Cartagena Terminal .	Cartagena.	Machina.	Main Line.	1.470	.984	3	.485	1.235	2	1.85	.235	—	—	—	Wooden trestles.	473.11	—
Cartagena Terminal .	Cartagena.	Machina.	Sidings.	2.358													

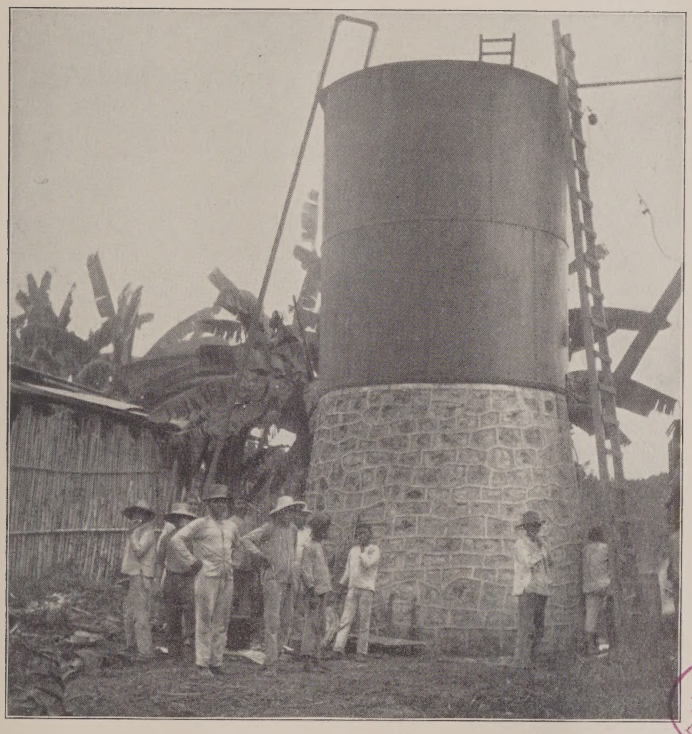
and other necessary buildings built chiefly of corrugated iron. At Cartagena on the broad Plaza de la Independencia is the principal station on the road, and the general offices of the company. This building is constructed of masonry, and is designed to conform architecturally with the principal buildings of Cartagena, and to provide cool and airy offices for the company's officers and employees.

The natural conditions governing the selection of materials and designs for buildings, water stations, etc., in the tropics differ from those influencing similar work in the north. No provision is necessary for snow or frost, but roofs and walls must be able to stand a force of rainfall never seen out of the tropics, and woodwork must be protected against rapid decay during the wet seasons. The white ants are even a more destructive enemy to wood than is the climate, and for this reason sooner or later, woodwork is almost certain to be replaced with masonry unless it is well above the ground. The picture showing one of the water tanks illustrates the most durable type of construction.

The equipment of the road is of the American type, and consists of four 40-ton Rhode Island 8-driver locomotives, three 20-ton Porter and one 25-ton Brooks 4-driver locomotives, and one 12-ton Porter switching engine. The passenger cars are of three types; first, second, and third classes, and the freight and cattle cars of the usual American form. It is, of course, particularly necessary for a railway so far from a base of general railway supplies to be more than usually self-contained in the way of stores and shop machinery, a fact which adds materially to the first cost and the expense of operation of isolated South American railways.

The road was opened to public service for its full length on the 1st of August, 1894, the formal opening having taken place with appropriate and impressive ceremonies on the 20th of July before, the anniversary of the independence of Colombia.

It is difficult to adequately describe the mental attitude of the peasants of the neighboring small towns towards a steam railroad, which in comparatively few months had been stretched across a country that for centuries had known no change. To them the engines were "horses of iron fed with fire," and in their simple language no other words could describe their ideas more accurately. Their curiosity and desire to ride in the strange conveyances were hardly sufficient to overcome the conservatism inbred by generations of unchanging cus-



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Water Tank.

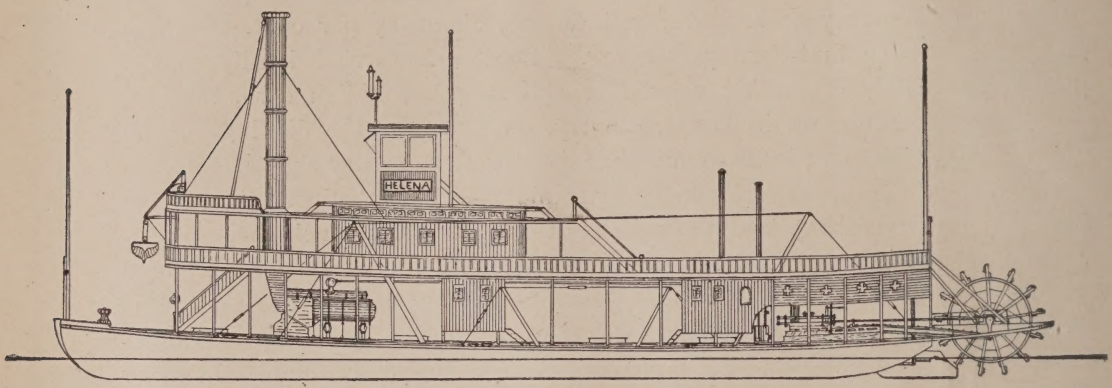
toms, and it has required both abnormally low rates and patient encouragement of small shippers to oust that powerful competitor of the South American railways, the overburdened *burro*, or donkey. Gradually, however, the local business along the line has developed, the cultivation of the neighboring territory increased, the *burro* competition ended, and Cartagena put in a position of dependence upon the railway for its daily supplies.

Except for a multitude of private and public cisterns the city is without any water supply system, and one of the daily tasks of the railway is to bring in water in tank cars. The number of passengers carried per year has averaged 60,000, about 15 per cent. of whom have been first-class passengers. The goods carried locally consist principally of market vegetables and supplies, Indian corn, tobacco, wood, grass, water, cattle, poultry, molasses for the distilleries, and imported manufactured merchandise for the country shopkeepers.

The "through" business, or traffic exchanged between the Magdalena River boats and the railway at Calamar, is of much more importance than the local business, and, owing to the establishment of a service of river boats under the same management as the railway, is rapidly increasing. The goods thus exchanged are the imported products of Europe and the United States purchased by the merchants of the interior towns and the exported products of the interior, consisting of coffee, tobacco, hides, ivory-nuts, cacao, cotton, minerals and specie. Coffee is the most valuable of the exported agricultural products, and tobacco the next. Goods for export are taken on through bills of lading from all the river ports to the pier at Cartagena, and *vice versa*. The movement of imported goods is facilitated by a rule of the custom house permitting the discharge of goods upon the filing of a bond and the payment of a percentage of the duties, the remainder being paid in due course by the consignees in the interior.

The staff of executive officers of the railway are American and English, as are also the chief employees, engine drivers, conductors, terminal superintendents, etc. The office accounting force is partly Colombian and partly foreign; brakemen and stokers are either Colombians or Jamaica negroes. The steamboat captains are either Colombians or foreigners who have resided a long time in the country; the pilots and other officers, and, of course, the crews, are all Colombians. The railway is operated by telegraph, all trains being controlled by the dispatcher at Cartagena, a maximum speed of 30 kilometers per hour

allowed, and an average running speed, including stops, of 26 kilometers per hour maintained. Both roadbed and engines are competent to sustain as high a speed as the average American railway, but the natural conditions have shown higher speeds to be unnecessary and less economical. On the railway imported coals are used exclusively for fuel, but the river steamboats use wood only. The language employed in the actual operation of the trains is English, but all other business of the company is conducted in Spanish, and nearly all of the principal employees speak both languages.



General Design of Cargo Steamboats "Alicia" and "Helena" of the Compañia Fluvial de Cartagena.

Material: Steel. — Capacity: 300 tons. — Length: 165 feet. — Breadth; 33 feet. — Draught fully loaded: 4 feet. — Speed: 12 miles per hour. Builders: Jas. Rees & Sons Company, Pittsburg.

During the first few years of its operation, the railway suffered from the insufficient capacity of the line of steamboats connecting with the railway at Calamar, and a company was finally organized to undertake that part of the business. The new company, the Compañia Fluvial de Cartagena, put its first boat upon the river a little more than a year ago, and since that time has purchased the fleet of the former contracting company, and added to its own until it has twelve boats in operation. These boats are all built of steel, and have been received in parts from England, Germany or the United States, and constructed at Cartagena. Six of the boats are of 300 tons burthen, or over, and six of them of a lesser size. With the exception of two of the smaller, the boats are all of the stern-paddle-wheel type, a familiar sight on the western and southern rivers of the United States. Those

On the Magdalena River.

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Town of Magangué, Magdalena River.

of English, German and American construction are very nearly alike in design, but the engines of the American boats are of the simple high-pressure, non-condensing type, while those on the English and German boats are either compound or triple-expansion condensing engines. No more satisfactory style of boat, both as to general design and machinery, has been found than those built at Pittsburgh, one of which is shown in the accompanying sketch and illustration.[1]

The service performed by the boats can be readily understood from the map of the Magdalena Valley. This service is divided into two parts, the most important being that between Calamar and ports up to and including Dorada, between which ports regular trips are made every few days. At Dorada connection is made with a short railway which transports goods and passengers around the rapids near Honda. These rapids are not navigable in the ordinary sense of the word, although with the assistance of powerful steam winches and cables fastened to the banks, the steamboats necessary for the service above the rapids are more or less easily conveyed thither.

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[1] The approximate specifications of these boats are as follows:

Length, 145′ on deck; beam, 33′; depth of hold, 4′ 6″.

Floor frames, angle steel 2″ x 3″, 18″ apart.

Deck beams of angle steel, 3′ apart, except forward, where for strength they are much nearer.

Plating. Open hearth steel, galvanized. Keel plates, 7 pounds to the square foot. Bow and angle plates and exposed parts, 8 pounds to the square foot. Top plates on sides and bottom, 6 pounds to the square foot. Seams and butts double rivetted.

Bulkheads. One center and two wings, fore and aft, of Nos. 10 and 12 wire gauge steel, stiffened with angle iron uprights, and bulkhead plates rivetted to bottom plating. Compartments made as water-tight as possible.

Cross bulkheads. Five of steel, No. 12 wire gauge.

Keelsons. One longitudinal on each side, of 3″ Z bars.

A breast hook forward stiffens the bow, strengthening the supports for capstan and nigger engine, bitts, etc.

Engine beams. Angle iron and steel plating, well secured.

Transom. Angle iron and steel plating, strongly made for supporting engine beams and rudder.

Decking. $\frac{1}{8}$″ iron plating, galvanized.

Rudders. Three balance rudders, with stocks and tillers of wood.

Hog-chains. One set on each side of $1\frac{1}{2}$″ steel rods. One set on each side of smaller relief chains. One set of chains and braces suspending wheel support.

Cabin frame, upper deck, etc. Composite wood and iron.

Engines. One pair high-pressure engines, 15″ diameter of cylinders and 6′ stroke.

Boilers. Horizontal, cylindrical tubular type, $3\frac{1}{2}$″ tubes, tested to 225 pounds, and intended for working pressure of 160 pounds. Fire-boxes arranged for wood fuel.

From the terminus of the Ferrocarril de la Dorada, just above Honda, a steamboat service is maintained with ports up to 150 miles further up the river, or about 750 miles from the river's mouth.

Upon the Lebrija and Sogomoso rivers, tributaries to the Magdalena, the steamboat company operates a supplementary service of small steamboats in connection with their main line of boats. About 40 per cent. of the total goods handled upon the river passes through Honda, either by being exchanged between the lower and upper river boats, or by being brought or taken away by the trains of mules constantly on the road between the capital, Bogotá, and Honda. The quick dispatch and safety of goods carried by the boats and railway is in sharp contrast with the transportation of the same goods in the interior. It is not an uncommon sight to see thousands of bales of goods lying on the banks, unprotected from the drenching rains, and awaiting nothing better than a rough trip on the back of a mule for many days, or a moist voyage up some small stream in a leaky canoe.

Nearly all of the river boats are fitted with adequate passenger accommodations, and the voyage from Calamar to the head of navigation and return can be made not only with comfort and pleasure, but is full of interest and novelty. In time it may be appreciated by the American people that within a comparatively few hundred miles from their own coast, and easily reached by comfortable steamships from New York, is a country awaiting and inviting their exploration. Perhaps the newly awakened interest in things West-Indian and Spanish-American may turn our winter pleasure-seekers southward, and make of the Magdalena another Nile. Cartagena, with its ancient walls and fortresses, its palace of the Inquisition and underground passages, and its historical associations with the days of conquest and piracy, can well claim equality with many an old world tourists' haunt in point of interest. In appearance little has changed in the town since those early days, but commerce has taken the place of plunder in sustaining the city, and its water front and warehouses are resonant with the hum of trade where once was the rattle of musketry and the grinding of steel.

MAP OF THE

Valley of the River Magdalena,

RAILWAYS IN OPERATION.

PROJECTED RAILWAYS.

CONNECTING STEAMER LINES.

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PLAN
OF THE
CITY OF CARTAGENA
SHOWING THE LOCATION OF THE
TRACKS, BUILDINGS AND WHARVES
OF THE
CARTAGENA TERMINAL & IMPROVEMENT CO. LD.,
AND CARTAGENA-MAGDALENA RAILWAY CO.

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